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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RADOSLAW ROMUALD ZAKRZEWSKI

Appeal 2009-005745
Application 10/803,872
Technology Center 2100

Before JAMES D. THOMAS, JOHN A. JEFFERY, and
ST. JOHN COURTENAY III, *Administrative Patent Judges*.

COURTENAY, Administrative Patent Judge.

DECISION ON APPEAL¹

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the “MAIL DATE” (paper delivery mode) or the “NOTIFICATION DATE” (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1-36. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Invention

Appellant's invention describes "techniques for using statistical analysis to reduce the number of samples required in accordance with statistical analysis confidence intervals to verify correctness of a component. These techniques may be used in verification of a neural network or other hardware or software component." (Abst. 65).

Claim 1 is illustrative:

1. A method for verifying accuracy of a component that is implemented from a model, comprising:

receiving a number of randomly selected sample, M , that result from at least one test of the component, for $M \geq 1/\epsilon \ln(1/\delta)$,

wherein

δ represents a confidence value in the range $0 < \delta < 1$,

ϵ represents an accuracy level of p -est to its true value p , in the range $0 < \epsilon < 1$,

p represents a probability that a randomly selected point is in accordance with a selected criterion, F ,

p -est, an estimate of p based on the M randomly selected samples, is zero,

and a probability that $(p \geq \epsilon)$ is equal to or less than δ ;

determining if each of said randomly selected samples is not in accordance with said selected criterion, F; and

verifying accuracy of said component based on said determining.

Appellant appeals the following rejections:

1. Claims 1-36 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.
2. Claims 1, 16-19, and 34-36 stand rejected under 35 U.S.C. § 101 as lacking patentable utility.

ISSUES

Based upon our review of the administrative record, we have determined that the following issues are dispositive in this appeal:

1. Under 35 U.S.C. § 101, did the Examiner err in concluding that claims 1-36 are directed to non-statutory subject matter?
2. Under 35 U.S.C. § 101, did the Examiner err in finding that claims 1, 16-19, and 34-36 lack patentable utility?

GROUPING OF CLAIMS

Appellant argues all rejected claims as a group (App. Br. 8 *et seq.*). We select representative claim 1 to decide the appeal for the first issue before us on appeal. *See* 37 C.F.R. § 41.37(c)(1)(vii).

FINDINGS OF FACT (FF)

1. Appellant's Specification discloses:

The component may be one of: a neural network, a fuzzy logic model, a fuzzy logic classifier, and a statistical k-neighbor classifier. The component may be included in a system with at least one other component. The component may be a first component, and an output of a second component may be used as an input to the first component, and the method may further comprise:

determining whether said first component is verified as correct in accordance with error that may be introduced by said second component's output.

(Spec. 3:21 –4:3).

35 U.S.C. § 101

PRINCIPLES OF LAW

Statutory Subject Matter

The subject matter of claims permitted within 35 U.S.C. § 101 must be a machine, a manufacture, a process, or a composition of matter. Moreover, our reviewing court has stated that “[t]he four categories [of § 101] together describe the exclusive reach of patentable subject matter. If the claim covers material not found in any of the four statutory categories, that claim falls outside the plainly expressed scope of § 101 even if the subject matter is otherwise new and useful.” *In re Nuijten*, 500 F.3d 1346, 1354 (Fed. Cir. 2007); *accord In re Ferguson*, 558 F.3d 1359, 1365 (Fed. Cir. 2009). This latter case held that claims directed to a “paradigm” are nonstatutory under 35 U.S.C. § 101 as representing an abstract idea. Thus, a “signal” cannot be patentable subject matter because it is not within any of the four categories. *Nuijten*, 500 F.3d at 1357.

The Supreme Court has held that “[e]xcluded from such patent protection are laws of nature, natural phenomena, and abstract ideas.” *Diamond v. Diehr*, 450 U.S. 175, 185 (1981). “An idea of itself is not

patentable.”” *Id.* at 185 (quoting *Rubber-Tip Pencil Co. v. Howard*, 20 Wall. 498, 507, 22 L.Ed. 410 (1874); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (“[M]ental processes, and abstract intellectual concepts are not patentable.”); *see also id.* at 71 (“It is conceded that one may not patent an idea.”)).

A claim that recites no more than software, logic or a data structure (i.e., an abstraction) does not fall within any statutory category. *In re Warmerdam*, 33 F.3d 1354, 1361 (Fed. Cir. 1994). Significantly, “[a]bstract software code is an idea without physical embodiment.” *Microsoft Corp. v. AT&T Corp.*, 550 U.S. 437, 449 (2007). The unpatentability of abstract ideas was recently reaffirmed by the U.S. Supreme Court in *Bilski v. Kappos*, 130 S.Ct. 3218, 3222 (2010).

ANALYSIS – statutory subject matter under § 101

We decide the question of whether the Examiner erred in concluding that claims 1-36 are directed to non-statutory subject matter under 35 U.S.C. § 101.

At the outset, based upon our review of the claims in light of Appellant’s Specification (*see e.g.*, “Summary of Invention” pp. 3-6 describing explicit statistical mathematical formulas), we conclude that each of Appellant’s claims 1-36 is directed to a mathematical algorithm. *Cf. also* EQUATIONS 1-34 described in the Specification, pp. 16-33.

Appellant contends, *inter alia*, that “the final result of the presently claimed invention, for example, a component implemented from a model that is verified as accurate according to the recited criteria, is useful, concrete and tangible” (App. Br. 10).

However, our reviewing court has determined that the “useful, concrete, and tangible result” test associated with *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998) is inadequate. *In re Bilski*, 545 F.3d 943, 959-960 (Fed. Cir. 2008) (en banc); *see also Bilski v. Kappos*, 130 S.Ct. 3218, 3231 (2010) (“[N]othing in today’s opinion should be read as endorsing interpretations of § 101 that the [CAFC] has used in the past. *See, e.g., State Street*, 149 F.3d, at 1373; *AT&T Corp.*, 172 F.3d, at 1357.”). Therefore, we find Appellant’s argument unavailing regarding the “useful, concrete and tangible” test of *State Street*. (See App. Br. 10).

Appellant further avers that “[f]or example, a practical application would be determining if a component has not been accurately implemented from a model of the component, in which case, for example, the component could be discarded or indicated as needing to be corrected.” (App. Br. 11).

However, we note that Appellant’s Specification discloses that “[t]he component may be one of: a neural network, a fuzzy logic model, a fuzzy logic classifier, and a statistical k-neighbor classifier.” (FF 1). We conclude that these disembodied mathematical constructs are “paradigms” that are nonstatutory under 35 U.S.C. § 101 as representing abstract ideas. *See Ferguson*, 558 F.3d at 1365.

Based upon our review of Appellant’s claims, we conclude that the end result of each independent claim on appeal is a plurality of iteratively computed numeric values similar to the computed updated alarm limit data values proscribed by *Parker v. Flook*, 437 U.S. 584 (1978). The numeric values resulting from the data gathering and mathematical computations of the present claims on appeal fall short of being utilized in any manner to

perform a corresponding control function of a physical machine, such as opening a rubber mold, as in *Diamond v. Diehr*, 450 U.S. 175. Additionally, these claims do not survive the analysis from *Ex parte Gutta*, 93 USPQ2d 1025 (BPAI 2009) (precedential).

In particular, we conclude that the claims on appeal are not limited to a tangible practical application in which the mathematical algorithm is applied that results in a real-world use. *See* Ans. 3; *see also Gutta*, 93 USPQ2d at 1031 (holding that system claim 14 was non-statutory under § 101 despite reciting a memory and processor). Nor are the claims on appeal limited so as to not encompass substantially all practical applications of the mathematical algorithm even in one field of use. *See id.*

Overshadowing all of this analysis, we are in accord with the Examiner's conclusion (Ans. 3) that the claims in this appeal are directed to abstract ideas according to the earlier-noted precedent since these claims are directed to verification of a component that is implemented from a mathematical model.

For at least the aforementioned reasons, we find no reversible error regarding the Examiner's rejection of representative claim 1 and claims 2-36 (and not argued separately) as being directed to non-statutory subject matter under 35 U.S.C. § 101. *See* 37 C.F.R. § 41.37(c)(1)(vii).

35 U.S.C. § 101

PRINCIPLES OF LAW

Utility Requirement

The utility requirement of § 101 mandates that the invention be operable to achieve useful results. *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1571 (Fed. Cir. 1992). Lack of utility is a question of fact. *In re Cortright*, 165 F.3d 1353, 1356 (Fed. Cir. 1999).

The PTO has the initial burden of challenging a patent applicant's presumptively correct assertion of utility. *In re Brana*, 51 F.3d 1560, 1566 (Fed. Cir. 1995). "If the PTO provides evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility, however, the burden shifts to the applicant to submit evidence sufficient to convince such a person of the invention's asserted utility. *Id.*" *In re Swartz*, 232 F.3d 862, 864 (Fed. Cir. 2000).

ANALYSIS - *Utility Requirement under § 101*

We decide the question of whether claims 1, 16-19, and 34-36 lack patentable utility under 35 U.S.C. § 101.

At the outset, we observe that the Examiner has withdrawn in the Answer (p. 2) the § 112, first paragraph, enablement rejection for claims 12 and 30 as set forth on page 5 of the Final Rejection. Therefore, we do not reach the issue of enablement under § 112, first paragraph, as this rejection is not before us on appeal.

Regarding the issue of patentable utility under 35 U.S.C. § 101, the Examiner makes the following factual findings:

Examiner's response

Claim 1 contains the formula $M \geq (1/\epsilon) \ln(1/\delta)$ where the ranges can be $0 < \delta < 1$ and $0 < \epsilon < 1$. Lack of utility comes from the values of $1/\delta$ and $1/\epsilon$ as these values approach 0. When these values approach 0 the resulting values approach infinity. As both δ and ϵ approach 0, the values of $1/\delta$ and $1/\epsilon$ approach infinity. Using the initial equation $M \geq \text{Infinity} \ln(\text{infinity})$, which lacks utility.

(Ans. 11).

We note that “[t]he PTO may establish a reason to doubt an invention's asserted utility when the written description ‘suggest[s] an inherently unbelievable undertaking or involve[s] implausible scientific principles.’” *In re Cortright* 165 F.3d at 1357 (quoting *In re Brana*, 51 F.3d at 1566).

Here, from basic calculus, we agree with the Examiner that the values of $1/\delta$ and $1/\epsilon$ will both approach infinity in the limit as the denominators δ and ϵ approach zero. However, we observe that the express language of the claim provides ranges where “ δ represents a confidence value in the range $0 < \delta < 1$ ” and “ ϵ represents an accuracy level of p-est to its true value p, in the range $0 < \epsilon < 1$.” (Claim 1). Thus, we conclude that the denominators δ and ϵ are each expressly limited by the claim language to values of greater than zero and less than one.

Given the express ranges recited in the claim, we find the claimed functions $1/\delta$ and $1/\epsilon$ can never actually be infinity (i.e., $1/\text{zero} = \text{undefined}$) because the denominators δ and ϵ are expressly limited by the claim language to ranges of greater than zero and less than one. Thus, the mathematically undefined limit of zero in the denominator can never be reached under a broad but reasonable interpretation of the claim. (Claim 1).

Therefore, we find the Examiner has not established a reason to doubt the invention's asserted utility under 35 U.S.C. § 101. Moreover, because the Examiner has withdrawn the § 112 enablement rejection, (Ans. 2) the Examiner has also not established under 35 U.S.C. § 112, first paragraph, that “the written description ‘suggest[s] an inherently unbelievable undertaking or involve[s] implausible scientific principles.’” *See In re Cortright* 165 F.3d at 1357.

Because the utility requirement of § 101 and the question of whether the Specification provides an enabling disclosure under § 112 are closely related,² we find the Examiner’s withdrawal of the enablement rejection also undermines the Examiner’s rejection of claims 1, 16-19, and 34-36 as lacking patentable utility under 35 U.S.C. § 101. *See* MPEP § 2164.07(I)(A.) (“If a claim fails to meet the utility requirement of 35 U.S.C. 101 because it is shown to be nonuseful or inoperative, then it necessarily fails to meet the how-to-use aspect of the enablement requirement of 35 U.S.C. 112, first paragraph.”). *See also* MPEP § 2164.07(I)(B.) (“When the examiner concludes that an application is describing an invention that is nonuseful, inoperative, or contradicts known scientific principles, the burden is on the examiner to provide a reasonable basis to support this conclusion. Rejections based on 35 U.S.C. 112, first paragraph and 35 U.S.C. 101 should be made.”)(underline added).

For these reasons, we reverse the Examiner’s rejection of claims 1, 16-19, and 34-36 as lacking patentable utility under 35 U.S.C. § 101.

² *See Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1358 (Fed. Cir. 1999).

CONCLUSIONS

1. The Examiner did not err in concluding that claims 1-36 directed to non-statutory subject matter under 35 U.S.C. § 101.
2. The Examiner erred in finding that claims 1, 16-19, and 34-36 lack patentable utility under 35 U.S.C. § 101.

DECISION

Because we have sustained at least one rejection for each claim on appeal, the Examiner's decision rejecting claims 1-36 under 35 U.S.C. § 101 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

ORDER
AFFIRMED

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